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10/800,905	03/15/2004	Dana Alexa Totir	08935-270001	1479
26161 7590 04/11/2007 FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER ALEJANDRO, RAYMOND	
			ART UNIT	PAPER NUMBER
			1745	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/11/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/800,905	<b>Applicant(s)</b> TOTIR ET AL.	
	<b>Examiner</b> Raymond Alejandro	<b>Art Unit</b> 1745	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 March 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) 29,30 and 47-54 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 and 31-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers:**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>06/09/04 and 07/12/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Group I and Species 2 (claims 1-28 and 31-46) in the reply filed on 03/16/07 is acknowledged. *To some extent, applicant traversed the election of species and made the statement that at least claims 1-28 and 31-46 read on elected Species 2 rather than claims 3-4 and 17-28 as set forth in the office action dated 03/08/07. Applicant's traversal of the species election was found convincing, and thus, claims 1-28 and 31-46 readable on elected Species 2 have been examined on the merits.*

### ***Information Disclosure Statement***

2. The information disclosure statements (IDS) submitted on 06/09/04 and 07/12/04 were considered by the examiner.

### ***Drawings***

3. The drawings were received on 03/15/04. These drawings are acceptable.

### ***Specification***

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

5. The abstract of the disclosure is objected to because it fails to clearly state the technical aspect of the present invention. Correction is required. See MPEP § 608.01(b).

Applicant is reminded of the proper content of an abstract of the disclosure.

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A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-4, 8-14, 17-25, 31-36 and 39-46 are rejected under 35 U.S.C. 102(e) as being anticipated by Bowles et al 2005/0191545.

The object of the present invention is aimed at an electrochemical cell wherein the disclosed inventive concept comprises the specific materials used therein.

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With regard to claims 1, 17, 19-20, 31, 39 and 45:

Bowles et al disclose lithium primary batteries (ABSTRACT/P0001) comprising manganese dioxide as a cathode material (P0014, 0046), and lithium as an anode material (P0013, 0023, 0036); an electrolyte comprising lithium bis(oxalate)borate and additional salts such as Li-tetrafluoroborate, Li-hexafluorophosphate, Li-hexafluoroarsene, Li-perchlorate or any mixture thereof (P0040). The cathode normally comprise a sheet current collector and a cathode material layer (P0014) wherein the current collector is made of an Al foil (P0035, 0049). Disclosed therein is anode current collector made of copper or the anode layer itself made of Li are (P0051-0052, 0025-0036). *This feature represents the second metallic element in electrical or operative contact with other surfaces of the electrochemical cell.*

**Examiner's note:** *it is noted that the limitation "equal to or less than about 0.2M, or 0.15M or 0.1 M or 0.05 M or 0.025 M" (in claims 9-13) does include 0 (zero) as a lower limit. Thus, the foregoing limitation also reads on free of "LiBOB" (the claimed Li-salt) or "0 mol %, or mass % or volume % at all" of LiBOB. (See MPEP 2173.05(c) Numeral Ranges & Amounts Limitations, II. Open-Ended Numerical Ranges). Note that the electrolyte of Bowles et al can contain Li-salts other than LiBOB.*

With regard to claims 2-4, 18, 32, 40 and 46:

The electrolyte comprises lithium bis(oxalate)borate (P0040); and additional salts such as Li-tetrafluoroborate, Li-hexafluorophosphate, Li-hexafluoroarsene, Li-perchlorate or any mixture thereof can also be used (P0040).

With regard to claim 8:

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The cathode normally comprise a sheet current collector and a cathode material layer (P0014) wherein the current collector is made of an Al foil (P0035, 0049).

As to claims 9-13, 21-25, 33-36 and 41-44:

**Examiner's note:** it is noted that the limitation "*equal to or less than about 0.2M, or 0.15M or 0.1 M or 0.05 M or 0.025 M*" (in claims 9-13) does include 0 (zero) as a lower limit. Thus, the foregoing limitation also reads on free of "LiBOB" (the claimed Li-salt) or "*0 mol %, or mass % or volume % at all*" of LiBOB. (*See MPEP 2173.05(c) Numeral Ranges & Amounts Limitations, II. Open-Ended Numerical Ranges*). *Note that the electrolyte of Bowles et al can contain Li-salts other than LiBOB.*

With regard to claim 14:

The Al foil has a dimension on the order of 570 micron (0.570 mm) (P0049).

Thus, the present claims are anticipated.

8. Claims 1-6, 8-14, 31-36 and 39-46 are rejected under 35 U.S.C. 102(e) as being anticipated by Otterstedt et al 2004/0053138.

With regard to claims 1, 31, 39 and 45:

Otterstedt et al disclose primary batteries (P0004) comprising a cathode material made of MnO<sub>2</sub> (P0046-0047) and an anode material made of either metallic lithium or alloys containing metallic lithium which may be alloys of Li with Al (P0038-0045). The non-aqueous electrolyte comprises conductive salts such as (P0066):

**lithium bis(oxalato)borates,**

**CF<sub>3</sub>SO<sub>3</sub>Li.**

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lactones, ethers, alkanes or perfluorinated alkanes and one or more conductive salt(s) selected from  $\text{LiBF}_4$ ,  $\text{LiPF}_6$ ,  $\text{LiAsF}_6$ ,  $\text{LiClO}_4$ , lithium salts of perfluorinated carboxylic acids and perfluorinated alkanesulphonic or arylsulphonic acids, lithium-bisfluoroalkylsulphonylimides, lithium-trisfluoroalkylsulphonylmethides, lithium fluoroalkylphosphates, lithium bis(oxalato)borates, lithium bis((salicylato)borates) or comprises these optionally embedded in a polymeric gel matrix.

Further disclosed is that the Li-anode is on steel (*the second metal surface*) (P0097).

**Examiner's note:** *since the anode material can be made of an alloy of Li with Al, the examiner is taking this feature as the one including the claimed Al-surface which is in electrical-operative contact with a second metal surface.*

**Examiner's note:** *it is noted that the limitation "equal to or less than about 0.2M, or 0.15M or 0.1 M or 0.05 M or 0.025 M" (in claims 9-13) does include 0 (zero) as a lower limit. Thus, the foregoing limitation also reads on free of "LiBOB" (the claimed Li-salt) or "0 mol %, or mass % or volume % at all" of LiBOB. (See MPEP 2173.05(c) Numeral Ranges & Amounts Limitations, II. Open-Ended Numerical Ranges). Note that the electrolyte of Bowles et al can contain Li-salts other than LiBOB.*

With regard to claims 2-4, 32, 40 and 46:

Otterstedt et al disclose combinations of Li-salts (P0066):

**lithium bis(oxalato)borates,**

**$\text{CF}_3\text{SO}_3\text{Li}$ .**

lactones, ethers, alkanes or perfluorinated alkanes and one or more conductive salt(s) selected from  $\text{LiBF}_4$ ,  $\text{LiPF}_6$ ,  $\text{LiAsF}_6$ ,  $\text{LiClO}_4$ , lithium salts of perfluorinated carboxylic acids and perfluorinated alkanesulphonic or arylsulphonic acids, lithium-bisfluoroalkylsulphonylimides, lithium-trisfluoroalkylsulphonylmethides, lithium fluoroalkylphosphates, lithium bis(oxalato)borates, lithium bis((salicylato)borates) or comprises these optionally embedded in a polymeric gel matrix.

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With regard to claims 5-6:

Anode material is made of either metallic lithium or alloys containing metallic lithium which may be alloys of Li with Al (P0038-0045). Further disclosed is that the Li-anode is on steel (*the second metal surface*) (P0097). **Examiner's note:** *since the anode material can be made of an alloy of Li with Al, the examiner is taking this feature as the one including the claimed Al-surface which is in electrical-operative contact with a second metal surface.*

As to claims 9-13, 21-25, 33-36 and 41-44:

**Examiner's note:** it is noted that the limitation "equal to or less than about 0.2M, or 0.15M or 0.1 M or 0.05 M or 0.025 M" (in claims 9-13) does include 0 (zero) as a lower limit. Thus, the foregoing limitation also reads on free of "LiBOB" (the claimed Li-salt) or "0 mol %, or mass % or volume % at all" of LiBOB. (See MPEP 2173.05(c) *Numerical Ranges & Amounts Limitations, II. Open-Ended Numerical Ranges*). Note that the electrolyte of Bowles et al can contain Li-salts other than LiBOB.

Thus, the present claims are anticipated.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various



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claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 9-13, 21-25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over: a) Bowles et al 2005/0191545 and/or b) Otterstedt et al 2004/0053138 as applied to foregoing claims above, and further in view of Amine et al 2005/0019670.

Bowles et al and/or Otterstedt et al are both applied, argued and incorporated herein for the reasons discussed above. However, none of the preceding references fairly disclose the specific lithium salt concentration (*assuming arguendo that applicant's claim are intended to positively claim the Li-salt therein, a point not admitted by the examiner based upon the claim language, see Examiner's Note above*); and the specific second salt.

As to claims 9-13 and 21-25:

Amine et al disclose Li-based batteries (TITLE) using LiBOB in an amount ranging from .0005 to about 2 wt % (P0012), specifically in an amount of 0.005 % % (P0018).

As to claim 28:

Amine et al disclose to combine different Li-salts including LiCF<sub>3</sub>SO<sub>3</sub> (Li-trifluoromethanesulfonate) (P0009).

By compounding these teachings, it would have been obvious to a skilled artisan at the time the invention was made to use the specific lithium salt concentration of Amine et al in the battery of either Bowles et al and/or Otterstedt et al as Amine et al disclose that when the

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specified Li-salt is used in the disclosed amount the cell shows better capacity retention than other cell system using other Li-salt additives. Further, the specified Li-salt, when used in the disclosed amount, have the ability to passivate the surfaces of both the anode and the cathode, thereby enhancing the capacity retention of both electrodes. This provides strong protection against the surface reaction that may otherwise lead to an increase in interfacial resistance and fading of both the capacity and the power of cell. Generally speaking, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical.

*“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).* Thus, it is prima-facie obvious to choose or select the specific amount of the Li-salt. *See MPEP 2144.05 Obviousness of Ranges.*

With respect to the second salt, it would have been obvious to a skilled artisan at the time the invention was made to use the second salt of Amine et al in the battery electrolyte of Bowles et al as Amine et al disclose that it is known in the art to combine at least more than one Li-salt to enhance conductivity. Thus, ionic transport is improved.

12. Claims 5-7 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over: a) Bowles et al 2005/0191545 and/or b) Otterstedt et al 2004/0053138 as applied to foregoing claims above, and further in view of Boczer et al 2006/0216597.

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Bowles et al and/or Otterstedt et al are both applied, argued and incorporated herein for the reasons discussed above. However, none of the preceding references expressly disclose the specific second surface material and the cell case material.

As to claims 5-7:

Boczer et al disclose a lithium battery (ABSTRACT/P0001) comprising a cathode including an active material including  $\text{MnO}_2$ , and a current collector made of Al (P0007-0008, 0023, 0025, 0035/CLAIM 25-27); an anode comprising Li (P0033/CLAIM 24); and an electrolyte containing a Li-salt (P0034) and a cell case made of a metal such as Al, Ni or S/S (P0035).

As to claims 26-27:

Disclosed therein is the cell case made of a single metal such as Al, among others (P0035).

By compounding these teachings, it would have been obvious to a skilled artisan at the time the invention was made to use the specific second surface material and the cell case material of Boczer et al in the battery of either Bowles et al and/or Otterstedt et al as Boczer et al disclose that a cell case (the second surface) made of any one of the disclosed materials (i.e. Ni, S/S or Al) is a suitable housing to assembled a cell comprising an anode, a cathode and a separator. Thus, Boczer et al disclose the desirability of employing a cell case made of Ni, S/S or Al for assembling and completing a working battery cell. In this case, it can thus be concluded that cell cases made of Ni, S/S or Al provide suitable mechanical stability for holding and keeping together all the components of a cell battery.

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13. Claims 31-36 and 39-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowles et al 2005/0191545 in view of Amine et al 2005/0019670.

With regard to claims 31, 39 and 45:

Bowles et al disclose lithium primary batteries (ABSTRACT/P0001) comprising manganese dioxide as a cathode material (P0014, 0046), and lithium as an anode material (P0013, 0023, 0036); an electrolyte comprising lithium bis(oxalate)borate and additional salts such as Li-tetrafluoroborate, Li-hexafluorophosphate, Li-hexafluoroarsene, Li-perchlorate or any mixture thereof (P0040). The cathode normally comprise a sheet current collector and a cathode material layer (P0014) wherein the current collector is made of an Al foil (P0035, 0049). Disclosed therein is anode current collector made of copper or the anode layer itself made of Li are (P0051-0052, 0025-0036). *This feature represents the second metallic element in electrical or operative contact with other surfaces of the electrochemical cell.*

**Examiner's note:** *it is noted that the limitation "equal to or less than about 0.2M, or 0.15M or 0.1 M or 0.05 M or 0.025 M" (in claims 9-13) does include 0 (zero) as a lower limit. Thus, the foregoing limitation also reads on free of "LiBOB" (the claimed Li-salt) or "0 mol %, or mass % or volume % at all" of LiBOB. (See MPEP 2173.05(c) Numeral Ranges & Amounts Limitations, II. Open-Ended Numerical Ranges). Note that the electrolyte of Bowles et al can contain Li-salts other than LiBOB.*

With regard to claims 32, 40 and 46:

The electrolyte comprises lithium bis(oxalate)borate (P0040); and additional salts such as Li-tetrafluoroborate, Li-hexafluorophosphate, Li-hexafluoroarsene, Li-perchlorate or any mixture thereof can also be used (P0040).

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Bowles et al disclose an electrochemical cell as set forth above. However, the preceding reference fails to fairly disclose the specific lithium salt concentration.

As to claims 33-36, 39 and 41-45:

Amine et al disclose Li-based batteries (TITLE) using LiBOB in an amount ranging from .0005 to about 2 wt % (P0012), specifically in an amount of 0.005 % % (P0018).

By compounding these teachings, it would have been obvious to a skilled artisan at the time the invention was made to use the specific lithium salt concentration of Amine et al in the battery of Bowles et al as Amine et al disclose that when the specified Li-salt is used in the disclosed amount the cell shows better capacity retention than other cell system using other Li-salt additives. Further, the specified Li-salt, when used in the disclosed amount, have the ability to passivate the surfaces of both the anode and the cathode, thereby enhancing the capacity retention of both electrodes. This provides strong protection against the surface reaction that may otherwise lead to an increase in interfacial resistance and fading of both the capacity and the power of cell. Generally speaking, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it is prima-facie obvious to choose or select the specific amount of the Li-salt. *See MPEP 2144.05 Obviousness of Ranges.*

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14. Claims 31-36 and 39-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otterstedt et al 2004/0053138 in view of Amine et al 2005/0019670.

With regard to claims 31, 39 and 45:

Otterstedt et al disclose primary batteries (P0004) comprising a cathode material made of  $\text{MnO}_2$  (P0046-0047) and an anode material made of either metallic lithium or alloys containing metallic lithium which may be alloys of Li with Al (P0038-0045). The non-aqueous electrolyte comprises conductive salts such as (P0066):

**lithium bis(oxalato)borates,**

**$\text{CF}_3\text{SO}_3\text{Li}$ ,**

lactones, ethers, alkanes or perfluorinated alkanes and one or more conductive salt(s) selected from  $\text{LiBF}_4$ ,  $\text{LiPF}_6$ ,  $\text{LiAsF}_6$ ,  $\text{LiClO}_4$ , lithium salts of perfluorinated carboxylic acids and perfluorinated alkanesulphonic or arylsulphonic acids, lithium-bisfluoroalkylsulphonylimides, lithium-tris-fluoroalkylsulphonylmethides, lithium fluoroalkylphosphates, lithium bis(oxalato)borates, lithium bis((salicylato)borates) or comprises these optionally embedded in a polymeric gel matrix.

Further disclosed is that the Li-anode is on steel (*the second metal surface*) (P0097).

**Examiner's note:** *since the anode material can be made of an alloy of Li with Al, the examiner is taking this feature as the one including the claimed Al-surface which is in electrical-operative contact with a second metal surface.*

With regard to claims 32, 40 and 46:

Otterstedt et al disclose combinations of Li-salts (P0066):

**lithium bis(oxalato)borates,**

**$\text{CF}_3\text{SO}_3\text{Li}$ ,**

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lactones, ethers, alkanes or perfluorinated alkanes and one or more conductive salt(s) selected from  $\text{LiBF}_4$ ,  $\text{LiPF}_6$ ,  $\text{LiAsF}_6$ ,  $\text{LiClO}_4$ , lithium salts of perfluorinated carboxylic acids and perfluorinated alkanesulphonic or arylsulphonic acids, lithium-bisfluoroalkylsulphonylimides, lithium-tris-fluoroalkylsulphonylmethides, lithium fluoroalkylphosphates, lithium bis(oxalato)borates, lithium bis((salicylato)borates) or comprises these optionally embedded in a polymeric gel matrix.

Otterstedt et al disclose an electrochemical cell as set forth above. However, the preceding reference fails to fairly disclose the specific lithium salt concentration.

As to claims 33-36, 39 and 41-45:

Amine et al disclose Li-based batteries (TITLE) using LiBOB in an amount ranging from .0005 to about 2 wt % (P0012), specifically in an amount of 0.005 % % (P0018).

By compounding these teachings, it would have been obvious to a skilled artisan at the time the invention was made to use the specific lithium salt concentration of Amine et al in the battery of Otterstedt et al as Amine et al disclose that when the specified Li-salt is used in the disclosed amount the cell shows better capacity retention than other cell system using other Li-salt additives. Further, the specified Li-salt, when used in the disclosed amount, have the ability to passivate the surfaces of both the anode and the cathode, thereby enhancing the capacity retention of both electrodes. This provides strong protection against the surface reaction that may otherwise lead to an increase in interfacial resistance and fading of both the capacity and the power of cell. Generally speaking, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA

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1955). Thus, it is prima-facie obvious to choose or select the specific amount of the Li-salt. *See MPEP 2144.05 Obviousness of Ranges.*

15. Claims 1-13 and 17-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boczer et al 2006/0216597 in view of Amine et al 2005/0019670.

As to claims 1, 17, 31, 37, 39 and 45:

Boczer et al disclose a lithium battery (ABSTRACT/P0001) comprising a cathode including an active material including MnO<sub>2</sub>, and a current collector made of Al (P0007-0008, 0023, 0025, 0035/CLAIM 25-27); an anode comprising Li (P0033/CLAIM 24); and an electrolyte containing a Li-salt (P0034) and a cell case made of a metal such as Al, Ni or S/S (P0035). Disclosed therein is the cell case made of a single metal such as Al, among others (P0035). *In this instance, the Al current collector and the Al cell case stand for the two pieces of Al in electrical contact with each other.*

As to claims 3-4:

Boczer et al disclose combination of Li-salts as part of the electrolyte (P0034). *In other words, Boczer et al teaches first and second Li-based salts.*

As to claims 5-7:

Boczer et al disclose a lithium battery (ABSTRACT/P0001) comprising a cathode including an active material including MnO<sub>2</sub>, and a current collector made of Al (P0007-0008, 0023, 0025, 0035/CLAIM 25-27); an anode comprising Li (P0033/CLAIM 24); and an electrolyte containing a Li-salt (P0034) and a cell case made of a metal such as Al, Ni or S/S (P0035).



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Concerning claim 8:

Boczer et al disclose a current collector made of Al (P0007-0008, 0023, 0025, 0035/CLAIM 25-27);

Concerning claims 19-20:

Boczer et al disclose a cathode including an active material including  $\text{MnO}_2$ , and a current collector made of Al (P0007-0008); and an anode comprising Li (P0033/CLAIM 24);

Concerning claim 26-27:

Disclosed therein is the cell case made of a single metal such as Al, among others (P0035).

Concerning claim 28:

Boczer et al teach the following Li-salts: LiTFS (Li trifluoromethanesulfonate) and LiTFSI (Li trifluoromethanesulfonimide) (P0034).

Boczer et al disclose a Li-based battery as described above. However, Boczer et al do not expressly disclose the specific Li-salt [bis(oxalate)borate salt] and the specific amount of it.

As to claims 1-2, 17-18, 31-32, 37-38, 39-40 and 45-46:

Amine et al disclose Li-based batteries (TITLE) using LiBOB in a specified amount (P0018).

As for claims 9-13, 21-25, 33-36 and 41-44

Amine et al disclose Li-based batteries (TITLE) using LiBOB in an amount ranging from .0005 to about 2 wt % (P0012), specifically in an amount of 0.005 % % (P0018).

In view of the above, it would have been obvious to a skilled artisan at the time the invention was made to use the specific Li-salt [bis(oxalate)borate salt] in the disclosed amount of

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Amine et al in the battery of Boczer et al as Amine et al teach when the specified Li-salt is used in the disclosed amount the cell shows better capacity retention than other cell system using other Li-salt additives. Further, the specified Li-salt, when used in the disclosed amount, have the ability to passivate the surfaces of both the anode and the cathode, thereby enhancing the capacity retention of both electrodes. This provides strong protection against the surface reaction that may otherwise lead to an increase in interfacial resistance and fading of both the capacity and the power of cell. Generally speaking, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it is prima-facie obvious to choose or select the specific amount of the Li-salt. *See MPEP 2144.05 Obviousness of Ranges*.

16. Claims 1-13 and 17-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boczer et al 2006/0216597 in view of Wietelmann et al 6506516.

As to claims 1, 17, 31, 37, 39 and 45:

Boczer et al disclose a lithium battery (ABSTRACT/P0001) comprising a cathode including an active material including MnO<sub>2</sub>, and a current collector made of Al (P0007-0008, 0023, 0025, 0035/CLAIM 25-27); an anode comprising Li (P0033/CLAIM 24); and an electrolyte containing a Li-salt (P0034) and a cell case made of a metal such as Al, Ni or S/S (P0035). Disclosed therein is the cell case made of a single metal such as Al, among others

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(P0035). *In this instance, the Al current collector and the Al cell case stand for the two pieces of Al in electrical contact with each other.*

As to claims 3-4:

Boczer et al disclose combination of Li-salts as part of the electrolyte (P0034). *In other words, Boczer et al teaches first and second Li-based salts.*

As to claims 5-7:

Boczer et al disclose a lithium battery (ABSTRACT/P0001) comprising a cathode including an active material including MnO<sub>2</sub>, and a current collector made of Al (P0007-0008, 0023, 0025, 0035/CLAIM 25-27); an anode comprising Li (P0033/CLAIM 24); and an electrolyte containing a Li-salt (P0034) and a cell case made of a metal such as Al, Ni or S/S (P0035).

Concerning claim 8:

Boczer et al disclose a current collector made of Al (P0007-0008, 0023, 0025, 0035/CLAIM 25-27);

Concerning claims 19-20:

Boczer et al disclose a cathode including an active material including MnO<sub>2</sub>, and a current collector made of Al (P0007-0008); and an anode comprising Li (P0033/CLAIM 24);

Concerning claim 26-27:

Disclosed therein is the cell case made of a single metal such as Al, among others (P0035).

Concerning claim 28:

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Boczer et al teach the following Li-salts: LiTFS (Li trifluoromethanesulfonate) and LiTFSI (Li trifluoromethanesulfonimide) (P0034).

Boczer et al disclose a Li-based battery as described above. However, Boczer et al do not expressly disclose the specific Li-salt [bis(oxalate)borate salt] and the specific amount of it.

As to claims 1-2, 17-18, 31-32, 37-38, 39-40 and 45-46:

Wietelmann et al disclose the use of Li-bisoxalatoborate as a conducting salt in Li-based batteries (Title/Abstract/COL 1, lines 5-9/CLAIM 14/Examples 1-6).

As for claims 9-13, 21-25, 33-36 and 41-44:

Wietelmann et al disclose using the disclosed salt in an amount of 0.56 m (Col 2, lines 36-50) to achieve certain degree of conductivity (COL 2, lines 36-50/Examples 1-6).

In view of the above, it would have been obvious to a skilled artisan at the time the invention was made to use the specific Li-salt [bis(oxalate)borate salt] of Wietelmann et al in the battery of Boczer et al as Wietelmann et al teach that such a Li-salt is used as a conducting salt to enhance the conductivity in battery cells while being easily soluble in aprotic solvents; thereby, leading to electrolytes having high conductivities.

With respect to the specific amount of Li-salt, it would have been obvious to a person of skill in the art at the time the invention was made to employ the specific molar amount of the Li-salt as instantly claimed or any other amount thereof in the battery of Boczer et al as Wietelmann et al themselves disclose that molar amount of the Li-salt are varied or adjusted to achieve predetermined degrees of conductivity of the electrolyte containing the Li-salt (See COL 2, lines 35-63 of Wietelmann et al. Therefore, Wietelmann et al recognize the specific molar amount of the Li-salt as a variable that achieves a recognized result (*i.e. molar amount or concentration of*

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*Li-salt being varied or adjusted to change degree of conductivity*) *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See also *Peterson*, 315 F.3d at 1330, 65 USPQ2d at 1382; and *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). Generally speaking, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it is prima-facie obvious to choose or select the specific amount of the Li-salt. ***See MPEP 2144.05 Obviousness of Ranges.***

17. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over: a) Bowles et al 2005/0191545; and/or b) Otterstedt et al 2004/0053138; and/or c) Boczer et al 2006/0216597 in view of Amine et al 2005/0019670; and/or d) Boczer et al 2006/0216597 in view of Wietelmann et al 6506516 as applied to claim 1 above, and further in view of Krause et al 5691081.

Bowles et al’545, Otterstedt et al’138, Boczer et al’597-Amine et al’670 and/or Boczer et al’597-Wietelmann et al’6516 are applied, argued and incorporated herein for the reasons discussed above. Nonetheless, none of the foregoing references expressly suggest the specific dimension of the Al-surface portion.

Krause et al disclose lithium-based batteries (TITLE) including either primary or secondary batteries (COL 7, lines 55-58) comprising a Li-anode (COL 7, lines 34-40) and a cathode containing at least manganese (COL 7, lines 34-55); an electrolyte containing Li-salt in an amount ranging from at least 0.1 M (COL 6, lines 57-63/COL 5, line 20-26) and an aluminum

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cathode current collector having a thickness of 0.51 mm (COL 12, lines 53-55/CLAIM 1/Abstract/COL 1, lines 15-22 & lines 60-61).

Based on the aforementioned, it would have been obvious to a skilled artisan at the time the invention was made to use the specific dimension of the Al-surface portion of Krause et al in any one of the cell batteries of Bowles et al'545, Otterstedt et al'138, Boczer et al'597-Amine et al'670 and/or Boczer et al'597-Wietelmann et al'6516 as Krause et al disclose that batteries comprising the specific Al current collector (Al-surface portion) having the specified dimension exhibits high voltages and optimal performance characteristics such as unrestricted operating temperature ranges, suitable discharge/charge rates and adequate cycling performance, particularly when Al components are used. *Moreover, where the only difference between the prior art and the claims is a recitation of relative dimensions (i.e. changes in size/proportion) of the claimed feature and a feature having the claimed relative dimensions would not perform differently than the prior art device/element/member, the claimed device/element/member is not patentably distinct from the prior art device/element/member. That is, limitations relating to the size of the feature/element/member are not sufficient to patentably distinguish over the prior art as it is noted that changes in size is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular size or dimension of the claimed Al portion is significant. In re Rose 105 USPQ 237; In re Rinehart 189 USPQ 143; In Gardner v. TEC Systems, Inc., 220 USPQ 777 & 225 USPQ 232, (See MPEP 2144.04 [R-1] Legal Precedent as Source of Supporting Rationale)*

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***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Raymond Alejandro  
Primary Examiner  
Art Unit 1745

  
RAYMOND ALEJANDRO  
PRIMARY EXAMINER